

Agriculture, Food & Natural Resources Career Cluster
Agricultural and Food Products Processing
Course Number 01.44100

Course Description

A laboratory course designed to introduce students to agricultural and food products processing operations and management. It includes instruction in the characteristics and properties of agricultural products and processing and storage techniques. It also offers instruction in equipment used in food processing.

Course Standard 1

AFNR-AFPP-1

Demonstrate employability skills required by business and industry.

The following elements should be integrated throughout the content of this course.

- 1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.
- 1.2 Demonstrate creativity with multiple approaches to ask challenging questions resulting in innovative procedures, methods, and products.
- 1.3 Exhibit critical thinking and problem solving skills to locate, analyze, and apply information in career planning and employment situations.
- 1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.
- 1.5 Apply the appropriate skill sets to be productive in a changing, technological, and diverse workplace to be able to work independently, interpret data, and apply team work skills.
- 1.6 Present a professional image through appearance, behavior, and language.

Course Standard 2

AFNR-AFPP-2

Relate the role of FFA in personal development and acquisition of leadership skills.

- 2.1 Summarizes the FFA history including a basic timeline of events, key people, and major historical occurrences of the organization.
- 2.2 Illustrates the relationship of the FFA within the Agricultural Education model and describe the role and function of the organizational structure from the chapter to national level.
- 2.3 Interprets basic FFA information such as the emblem, colors, motto, mission, salute, behavior and official dress.
- 2.4 Demonstrates communication skills individually and within group situations by using public speaking skills and parliamentary procedure abilities.
- 2.5 Designs personal leadership plan that includes opportunities for personal development through student, chapter, and community related activities.

Course Standard 3

AFNR-AFPP-3

Recognize the importance of food safety, identify the role of federal regulatory agencies in food processing, and explain the role of sanitation in processing foods.

- 3.1 Define terms associated with the processing and packaging of food.
- 3.2 Describe the methods for achieving commercial sterility of processed foods.
- 3.3 Identify sources of microbial contamination in foods.
- 3.4 Identify the role of federal agencies responsible for food safety.
- 3.5 Outline the elements of a NCA-FDA Better Process Control Plan.
- 3.6 Create a time line that identifies critical control points during the processing and packaging of food.
- 3.7 Explain the basic principles of food plant sanitation and their role in preventing food spoilage and maintaining clean processing facilities.
- 3.8 Compare and contrast types of sanitizers and their germicidal properties.
- 3.9 Identify factors affecting the germicidal properties of sanitizers.
- 3.10 Choose sanitizers based on their properties.

Course Standard 4

AFNR-AFPP-4

Cultivate an understanding of the microbiology of thermally processed foods, understand thermal processing and the establishment of the thermal process while learning and applying methods used in the processing of foods, and learn both methods and apply methods of preserving foods through acidification.

- 4.1 Develop an understanding for the basis of the thermal processes and implement the knowledge by participating in the thermal processing of various foods.
- 4.2 Analyze the establishment of the thermal process and the factors used to establish the scheduled process.
- 4.3 Evaluate methods used in processing foods and be able to determine the proper methods for processing foods based on the container and food type.
- 4.4 Develop an understanding of the history of the microbiology of food processing and the correlation to today's food industry.
- 4.5 Evaluate the characteristics and behavior of microorganisms in order to determine factors that cause them to grow and evaluate ways to manage the growth of spoilage organisms.
- 4.6 Define what classifies a food as acidified and then develop an understanding of the relationship it has in preserving foods.
- 4.7 Identify procedures and requirements for acidified foods and then implement techniques used in the preservation of acidified foods.

Course Standard 5

AFNR-AFPP–5

Recognize the importance of food container design, the use of proper filling and sealing procedures, proper food handling and sterilization processes, and post-process handling procedures used in producing thermally processed and shelf-stable products.

- 5.1 Define and properly use terms associated with food containers.
- 5.2 Create a time line which demonstrates advances made in the design of food containers.
- 5.3 Compare different types of food containers.
- 5.4 Select food containers for different types of foods and sealing processes.
- 5.5 Discuss causes of leaker spoilage in hermetically sealed, thermally processed foods.
- 5.6 Examine container closures and uncover causes of seam failure.
- 5.7 Justify the need for careful handling of containers before, during and after the processing and closure of thermally processed foods in hermetically sealed containers.
- 5.8 Examine the influence of cooling operations and water sanitizers on food preservation during post processing operations.
- 5.9 Justify the need for keeping accurate records of processes that occur at critical control points during the processing of containerized foods.

Course Standard 6

AFNR-AFPP–6

Identify types of closures for metal containers, glass containers, and semi-rigid containers and correct methods for the evaluation of these types of containers.

- 6.1 Provide the proper way to evaluate can types and structures, and discuss the pros and cons of the different types and structures.
- 6.2 Identify proper Double Seam Formation, Structure, Measurements and Evaluation for Integrity and Defects both visually and with tools, including a seam micrometer, countersink gauge, nippers, and others.
- 6.3 Identify and use the basic parts and definitions of glass containers and evaluate glass containers to insure container integrity.
- 6.4 Evaluate the closure of glass containers and frequency this should take place in order to determine if the container is adequate for the safety of the product.
- 6.5 Describe the principle of the vacuum seal and explain the importance it has on food safety.
- 6.6 Justify the procedures for preserving foods in plastic containers with double seam metal ends and heat-sealed ends, paperboard packaging, and flexible packaging to discuss and explain how to process foods in an aseptically packaged container.
- 6.7 Identify the different forms used in a canning facility and implement them in the record keeping of the facility as required by Food and Drug Administration.

Course Standard 7

AFNR-AFPP–7

Compare and contrast the FDA and USDA-FSIS in determining the equipment and instrumentation requirements for thermal processing systems, and select and operate equipment and instrumentation typically utilized in conventional canning systems based upon the regulations and requirements.

- 7.1 Identify equipment for thermal processing systems.
- 7.2 Compare valves for use in retort operations.
- 7.3 Describe the proper valves used in retort operations.
- 7.4 Compare temperature-indicating devices for recording the official processing temperature.
- 7.5 Select temperature-indicating devices for recording the official processing temperature.
- 7.6 Conduct accuracy checks on temperature-indicating devices.
- 7.7 Select temperature recording devices and temperature control systems for proper processing.
- 7.8 Discuss and describe the importance of process timing.
- 7.9 Select suitable timing devices for proper processing.
- 7.10 Discuss the process of steam supply, control, distribution, and circulation in still steam retort systems.
- 7.11 Create a record keeping spreadsheet for recording scheduled retort process critical factors.
- 7.12 Discuss equipment and processing considerations for still retort processing with overpressure.

Course Standard 8

AFNR-AFPP–8

List and explain the different types of leavening agents, food additives, baking powders, and both artificial natural sweeteners while analyzing the regulations that mandate policies and procedures for food additives.

- 8.1 List the four leavening agents and explain the purpose of leavening agents in baked goods.
- 8.2 List the ingredients in baking powder and analyze the purpose of each.
- 8.3 Identify three types of wheat appropriate for the baking process.
- 8.4 Explain how air and steam act as leavening agents.
- 8.5 Identify the purpose while discussing the pros and cons of the various food additives, while comparing and contrasting artificial and natural food additives.
- 8.6 Identify the various sweeteners used as additives in food, both natural and artificial.
- 8.7 Identify the government agencies that regulate the use of food additives and the policies that must be followed in order for a processing facility to remain legal.

Course Standard 9

AFNR-AFPP–9

Recognize the historical significance of food fermentation and dehydration, and identify the reasons for fermenting and dehydrating foods and explain the fermentation process.

- 9.1 Create a timeline representing the history of food fermentation.
- 9.2 Discuss the five main purposes of food fermentation.
- 9.3 Explain the process of fermentation.
- 9.4 Discuss the dehydration process.
- 9.5 Explain dehydration temperatures for various foods.
- 9.6 Compare blanching, sulfuring and sulfating as anti-oxidization agents used in dehydrating.
- 9.7 Compare and contrast dehydration processes used in food processing.
- 9.8 Discuss the impact of various drying methods on food appearance and flavor.

Course Standard 10

AFNR-AFPP–10

Identify, explain and discuss products that are derived from milk and how they are dispersed, pasteurized, and various ways of fermenting products derived from milk.

- 10.1 Identify each of the components of milk and how they are dispersed and be able to discuss the processing of milk.
- 10.2 Explain the milk pasteurization process while analyzing the similarities and differences of skim, low-fat, whole, and two percent milk.
- 10.3 Identify different kinds of products made from milk investigate and implement various ways of making fermented products from milk.

Course Standard 11

AFNR-AFPP–11

Apply principles of science to food processing while providing for a safe, wholesome and nutritious food supply.

- 11.1 Assess the importance of developing and maintaining sanitation standards.
- 11.2 Classify and explain the government requirements and government agencies associated with food quality and food safety.
- 11.3 List and describe methods of food processing, preserving, and packaging.
- 11.4 Explain the importance of food processing, preserving, and packaging.
- 11.5 Demonstrate the processing, preserving, and packaging of foods using various methods and techniques.
- 11.6 Analyze skills, education requirements, income, and advantages and disadvantages of careers in the food processing industry.